

Appl. No. 10/640,856

Amdt. Dated 25 October 2004

Reply to Office action of 9 September 2004

AMENDMENTS TO THE CLAIMS

Please substitute the following claims for the respective claims previously existing in this application.

1. (Currently amended) A electronic imaging component, said component comprising:
an electronics layer;
a monocrystalline photosensing element, said photosensing element fabricated in a vertically integrated optically active layer and bonded to said electronics layer;
a substantially vertical interconnect coupled to said electronics layer; and
said monocrystalline photosensing element further comprising a junction surrounding and at least partially encompassing said vertical interconnect, wherein charge carriers may be substantially laterally drawn toward the axis of ~~at least one of said junction and~~ said vertical interconnect, said junction including one of a p-type and an n-type material having a first side adjacent said vertical interconnect and the other of the one of a p-type and an n-type material adjacent a second side opposed to said first side and positioned horizontally from said first side;
~~said optically active layer bonded to said electronics layer; and~~
~~said optically active layer positionally disposed proximate to a metalization surface of said electronics layer.~~

2. (Original) The imaging component of claim 1, wherein said electronics layer is substantially fully processed.

Appl. No. 10/640,856

Amdt. Dated 25 October 2004

Reply to Office action of 9 September 2004

3. (Currently amended) The imaging component of claim 1, wherein said monocrystalline photosensing element comprises at least one of a photodiode, a photomultiplier, a phototransistor, and a photoconductor.

4. (Currently amended) The imaging component of claim 1, wherein said optically active layer comprises at least one of Si, GaAs, InP, GaN, HgCdTe, ~~a-Si, p-Si, κ -Si~~, Ge, SiGe, and SiC, ~~a monocrystalline material, a polycrystalline material and an amorphous material.~~

5. (Original) The imaging component of claim 1, wherein said bonding comprises at least one of wafer-to-wafer bonding and die-to-wafer bonding.

6. (Currently amended) The imaging component of claim 1, wherein said interconnect comprises:

at least one of a metallized via, an electrical conductor, p-Si, and a semiconductor; and said interconnect extends substantially through said optically active layer.

Appl. No. 10/640,856

Amdt. Dated 25 October 2004

Reply to Office action of 9 September 2004

7. (Currently amended) An electronic imaging component array, said component array comprising:

an electronics array layer;

a monocrystalline photosensing element array, said monocrystalline photosensing element array fabricated in a vertically integrated optically active layer and bonded to said electronics array layer;

a plurality of substantially vertical interconnects coupled to said electronic layer; and
said monocrystalline photosensing element array further comprising a plurality of junctions substantially surrounding and at least partially encompassing said plurality of vertical interconnects, wherein charge carriers may be substantially laterally drawn toward the axes of at least one of said plurality of junctions and said plurality of interconnects, said junctions including one of a p-type and an n-type material having a first side adjacent said vertical interconnect and the other of the one of a p-type and an n-type material adjacent a second side opposed to said first side and positioned horizontally from said first side;

~~said optically active layer bonded to said electronics array layer; and~~

~~said optically active layer positionally disposed proximate to a metalization surface of said electronics array layer.~~

8. (Original) The imaging component array of claim 7 having a relatively high interconnect density.

9. (Original) The imaging component array of claim 8, wherein said high interconnect density comprises about one connection per up to about 10-250 square microns.

Appl. No. 10/640,856

Amdt. Dated 25 October 2004

Reply to Office action of 9 September 2004

10. (Original) The imaging component array of claim 7, wherein said interconnects comprise a plurality of at least one of metallized vias, electrical conductors, p-Si and semiconductors.

11. (Original) The imaging component array of claim 7, wherein the photosensing element fill factor is up to about 75%.

12. (Original) The imaging component array of claim 7, wherein the photosensing element fill factor is greater than 75%.

13. (Original) The imaging component array of claim 12, wherein the photosensing element fill factor is up to about 100%.

14. (Original) The imaging component array of claim 7, wherein the electronics circuitry is optimized for substantial parallel processing of array-captured images.

15. (Original) The imaging component array of claim 7, further comprising a plurality of vertically integrated optically active layers.

16. (Original) The imaging component array of claim 7, further comprising a plurality of vertically integrated electronic processing layers.

Appl. No. 10/640,856

Amdt. Dated 25 October 2004

Reply to Office action of 9 September 2004

17. (Currently amended) The imaging component array of claim 7, wherein said optically active, monocrystalline layer comprises at least one of Si, GaAs, InP, GaN, HgCdTe, ~~a Si, p-Si, x-Si, Ge, SiGe, and SiC, a monocrystalline material, a polycrystalline material, and an amorphous material.~~

Appl. No. 10/640,856

Amdt. Dated 25 October 2004

Reply to Office action of 9 September 2004

18. (Currently amended) A electronic imaging component array, said component array comprising:

a plurality of electronics array layers;

a plurality of monocrystalline photosensing element arrays, said monocrystalline photosensing element arrays fabricated in a plurality of vertically integrated optically active layers and bonded to said electronics layers;

a plurality of substantially vertical interconnects coupled to said electronics array layers;
and

said monocrystalline photosensing element arrays further comprising a plurality of junctions substantially surrounding and at least partially encompassing said plurality of vertical interconnects, wherein charge carriers may be substantially laterally drawn to the axes of at least one of said plurality of junctions and said plurality of vertical interconnects, said junctions including one of a p-type and an n-type material having a first side adjacent said vertical interconnect and the other of the one of a p-type and an n-type material adjacent a second side opposed to said first side and positioned horizontally from said first side;

~~said optically active layers bonded to said electronics layers; and~~

~~said optically active layers positionally disposed proximate to a metalization surface of said electronics layers.~~

19. (Original) The imaging component array of claim 18, wherein different optically active layers are suitably adapted to demonstrate sensitivity to different regions of the electromagnetic spectrum.

Appl. No. 10/640,856

Amdt. Dated 25 October 2004

Reply to Office action of 9 September 2004

20. (Currently amended) The imaging component array of claim 18, wherein said optically active, layers comprise at least one of Si, GaAs, InP, GaN, HgCdTe, ~~a Si, p Si, x Si, Ge, SiGe, and SiC, a monocrystalline material, a polycrystalline material, and an amorphous material.~~